

**REMARKS**

Reconsideration and allowance of the claims pending in the subject application are requested.

**I. Status of the Claims:**

Claims 19, 37 and 45 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Arora *et al.* (US Pub No. 2004/0064568), herein after Arora; and

Claims 1-18, 20-36, 38-44 and 46-53 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Arora, and further in view of Atkinson *et al.* (US Pub No. 2002/0012329), hereinafter Atkinson.

**II. Response to the Rejection under 35 U.S.C. § 102(e):**

Before distinguishing claims 19, 37 and 45 from Arora, Applicants bring to the Examiner's attention, the following:

One feature of the present application is that when devices conduct device discovery by inquiring other devices (two encountering devices having no link to each other), they immediately get an indication regarding the probable presence of the application and service discovery middleware layer in the discovered device (inquiry response includes an indication for that) without needing to establish a communication session/connection with the discovered device. In case there is no indication that the middleware layer exists, the device can simply discard the inquiry response and no time or effort is used for connecting with that device. On the other hand, in case there is an indication that the discovered device probably includes the middleware layer (inquiry response includes such indication), the devices can establish a communication session/connection to validate the presence of such middleware layer and execute the middleware layer to conduct enhanced application and service discovery.

When considering Arora, it can be clearly seen that said reference is not directed to the above-mentioned situation. Arora, in contrast to the above, provides a distributed peer-to-peer platform where peers of the network can query whether other peers of the network are registered in the network (peers can discover other peers in the network by sending a query to a certain peer holding the information, where the information is decentralized). So, there is no disclosure in Arora relating to ad-hoc device discovery and the innovative indication of the middleware layer in connection with device discovery.

In addition to the above feature, when considering the way the actual routing table type of information is distributed there is a clear difference between the present invention and Arora. According to the present invention, each device of the network store and forward the whole combined application directory listing to encountered peer devices over point-to-point links, wherein the Arora *et al.* reference suggests a distributed hash table wherein the nodes store only a portion of the hash table and routing information to one or more other nodes in the network so that the bits and pieces of information the nodes hold forms the whole hash table, which is clearly in contrast to the teachings of the present application.

Now turning to the rejections:

**Paragraph 3:**

Claims 19, 37 and 45 include features not disclosed in Arora and overcome the rejection under 35 U.S.C. § 102(e), as follows:

**A. Claim 19:**

A method for performing device detection and service discovery in a mobile ad hoc communications network, comprising:

- (i) conducting an inquiry of the mobile ad hoc communications

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network to discover at least one nearby device, the inquiry including an indication that said at least one nearby device may include a middleware layer, said middleware layer being middleware software for providing application and service discovery;

The Examiner contends the abstract, Figure 2, and Paragraphs 14-15; 66; 129-131; 133; and 137 describe the claimed feature. Applicants disagree, as follows:

First, there is no description of a middleware software layer or other software in Arora that sits between one system and another, and provides a way for those systems to exchange information or connect with one another through the middleware layer, even though they have different interface, as described in Applicants' specification at Paragraphs 28-33.

Second, middleware is described in a technical dictionary e.g. Wikipedia as computer software that connects software components or applications. It is used most often to support complex, distributed applications. It includes web servers, application servers, content management systems, and similar tools that support application development and delivery. Middleware is especially integral to modern information technology based on XML, SOAP, Web services, and service-oriented architecture.

Applicants submit that Arora does not disclose middleware software for connecting peer devices together. Nor does Arora disclose a peer device conducting an inquiry to discover a nearby device providing an indication whether or not a middleware layer exists in the device. The P2P network of Arora does not equate to an ad hoc network including a middleware layer providing application and service discovery, Arora fails to disclose the claimed subject matter of feature (i).

(ii) when the inquiry includes the indication that said at least one nearby device may include the middleware layer:

The Examiner contends that Paragraphs 14, 16, 65 and 66 describe whether a nearby device includes an indication of a middleware layer. Paragraphs 14, 16, 65 and 66 describe a distributed index may be used to store presence information. There is no disclosure in the cited paragraphs whether the device contains a middleware layer providing application and service discovery within an ad hoc network. Arora fails to disclose the claimed subject matter of feature (ii).

- (iii) creating a connection to said at least one nearby device;
- confirming whether said at least one nearby device includes the middleware layer;
- and

The Examiner contends that Paragraphs 128-129, 149, 16 and 17 disclose the subject matter of feature (iii). The cited Paragraphs describe peer to peer platforms which provide mechanism to discover one another via a distributed index. Applicants can find no disclosure in the cited Paragraphs nor has the Examiner identified any disclosure in the cited Paragraphs where a connection is created between peer devices to confirm the peer device includes a middleware layer for application and service discovery in an ad hoc network. Arora discloses a distributed index for peer to per connection. A distributed index is a directory of information and does not equate to a middleware layer for application and service discovery. Arora fails to disclose the claimed subject matter of feature (iii).

- (iv) when said at least one nearby device includes the middleware layer:
- executing the middleware layer to perform application and service discovery.

The Examiner contends that Paragraphs 15, 18, 65, 74, 79, 109 and 351 describe the claimed subject mater of feature (iv). The cited Paragraphs describe a peer search or query via the distributed index to discover the presence of other participating peers. A peer registers a

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query in the distributed index to discover another peer. The queries may be routed to other peers. An instant messaging index may be used to route messages between peers. Applicants can find no disclosure in the cited Paragraphs nor has the Examiner identified any disclosure in the cited Paragraphs regarding a device in an ad hoc network containing a middleware layer to perform application and service discovery for other devices. Discovering the presence of other devices in the P2P network does not equate to executing a middleware layer for applications or service discovery, as described in Applicants' specification at Paragraph 10.

Summarizing, Arora describes a P2P network operation where connections of devices are made through a distributed index. There is no disclosure of the P2P devices including a middleware layer and using the middleware layer to exchange software and discover other devices including a middleware layer. Arora fails to disclose the features (i)-(iv) described above. The rejection of claim 19 under 35 U.S.C. § 102(e) is without support in the cited art. Withdrawal of the rejection and allowance of claim 19 are requested.

**B. Claim 37:**

A computer program product for performing device detection and service discovery in a mobile ad hoc communications network, comprising:

a computer readable medium storing:

(i) program code for conducting an inquiry of the mobile ad hoc communications network to discover at least one nearby device, the inquiry including an indication that said at least one nearby device may include a middleware layer, said middleware layer being middleware software for providing application and service discovery ;

Arora fails to disclose the claimed subject matter of feature (i) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(ii) program code for creating a connection to said at least one nearby device when the inquiry includes the indication that said at least one nearby device may include the middleware layer;

Arora fails to disclose the claimed subject matter of feature (ii) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(iii) program code for confirming whether said at least one nearby device includes the middleware layer when the inquiry includes the indication that said at least one nearby device may include the middleware layer; and

Arora fails to disclose the claimed subject matter of feature (iii) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(iv) program code for executing the middleware layer to perform application and service discovery when said at least one nearby device includes the middleware layer.

Arora fails to disclose the claimed subject matter of feature (iv) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

Summarizing, Arora does not support the rejection of claim 37 under 35 USC 102 (e) for the above indicated reasons. Withdrawal of the rejection and allowance of claim 37 are requested.

**C. Claim 45:**

A system for performing device detection and service discovery in a mobile ad hoc communications network, comprising:

(i) means for conducting an inquiry of the mobile ad hoc communications network to discover at least one nearby device, the inquiry including an indication that said at least one nearby device may include a middleware layer, said middleware layer being

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middleware software for providing application and service discovery;

Arora fails to disclose the claimed subject matter of feature (i) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(ii) means for creating a connection to said at least one nearby device when the inquiry includes the indication that said at least one nearby device may include the middleware layer;

Arora fails to disclose the claimed subject matter of feature (ii) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(iii) means for confirming that said at least one nearby device includes the middleware layer when the inquiry includes the indication that said at least one nearby device may include the middleware layer; and

Arora fails to disclose the claimed subject matter of feature (iii) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(iv) means for executing the middleware layer to perform application and service discovery when said at least one nearby device includes the middleware layer.

Arora fails to disclose the claimed subject matter of feature (iv) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

Summarizing, Arora does not support the rejection of claim 45 under 35 U.S.C. § 102(e) for the above indicated reasons. Withdrawal of the rejection and allowance of claim 45 are requested.

**Paragraphs 4-6:**

Claims 1-18; 20-26; 38-44 and 46-53 include features not disclosed or suggested in Arora in view of Atkinson and overcome the rejection under 35 U.S.C. § 103(a), as follows:

**A. Claim 1:**

A system for performing device detection and service discovery in a mobile ad hoc communications network, comprising:

- (i) a memory device; and
- (ii) a processor disposed in communication with the memory device, the

processor configured to:

Atkinson discloses a processor including a protocol stack comprising software components in a run-time system. The software components are replaced on the fly to update the protocol stack. Atkinson does not disclose or suggest a middleware layer providing application and service discovery and is not configured to execute features (iii)-(vi), as follows:

(iii) conduct an inquiry of the mobile ad hoc communications network to discover at least one nearby device, the inquiry including an indication that said at least one nearby device may include a middleware layer, said middleware layer being middleware software for providing application and service discovery;

Arora fails to disclose the claimed subject matter of feature (i) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(iv) when the inquiry includes the indication that said at least one nearby device may include the middleware layer:

Arora fails to disclose the claimed subject matter of feature (iv) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

v) create a connection to said at least one nearby device;  
confirm whether said at least one nearby device includes the middleware layer; and



Arora fails to disclose the claimed subject matter of feature (v) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

(vi) when said at least one nearby device includes the middleware layer: execute the middleware layer to perform application and service discovery.

Arora fails to disclose the claimed subject matter of feature (vi) for the same reasons indicated in connection with the consideration of the corresponding feature in claim 19.

Summarizing, Arora does not support the rejection of claim 1 under 35 U.S.C. § 102(e) for the above indicated reasons. Withdrawal of the rejection and allowance of claim 1 are requested.

**B. Claim 53:**

A wireless device in a mobile ad hoc communications network, comprising:

(iii) a processor disposed in communication with the memory device, the processor configured to:

(i) transmit with the transceiver a middleware inquiry of the mobile ad hoc communications network to discover at least one nearby device,

The Examiner contends that Atkinson at Paragraphs 5, 12 and 13 discloses the claimed subject matter of feature (i). The cited Paragraphs disclose communication apparatus interface and method for discovery of remote devices. The apparatus converts host data into transmission protocol-compliant coded form and converting received signals into a form that can be understood by a host application. Atkinson does not describe or suggest transmitting a middleware inquiry to nearby devices in an ad hoc network.

(ii) receive with the transceiver a response to the inquiry, including an indication that said at least one nearby device may include a middleware layer, said middleware

layer being middleware software for providing application and service discovery;

The Examiner contends that Arora in the abstract; Figure 2 and Paragraphs 14-15; 66, 129-131, 133 and 137 describe the subject matter of feature (ii). The cited Paragraphs, particularly 133, describe P2P platforms as a series of protocols, not APIs or software implementations. The protocols are defined by one or more messages exchanged among participants. The P2P platforms connect peer nodes with each other. The cited Paragraphs do not describe or suggest the platforms transmit indications that a device may include a middleware layer. Arora fails to disclose the claimed subject matter of feature (ii).

(iii) when the inquiry includes the indication that said at least one nearby device may include the middleware layer: create with the transceiver a connection to said at least one nearby device;

The Examiner contends that Arora at Paragraphs 128-129 and 149 discloses the claimed subject matter of feature (iii). The cited Paragraphs describe P2P platforms discovering each other. The P2P platforms enable peers to be independent of software and hardware and benefit from connection to millions of other peers. The cited Paragraphs demonstrate that peer platforms do not involve software layer, such as the middleware layer, for connection purposes. Aurora fails to disclose the claimed subject matter of feature (iii).

(iv) confirm whether said at least one nearby device includes the middleware layer; and

The Examiner contends that Arora at Paragraphs 16 and 17 describe the claimed subject matter of feature (iv). The cited Paragraphs describe a distributed index which notifies a registered peer when another peer joins the index. The cited Paragraphs do not describe or suggest the peer joining the index includes or excludes a middleware layer. Arora fails to

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disclose the claimed subject matter of feature (iv).

(v) when said at least one nearby device includes the middleware layer:  
execute the middleware layer to perform application and service discovery.

The Examiner contends that Arora at Paragraphs 15, 18, 65, 74, 79, 109, 351 describes the claimed subject matter of feature (v). The cited Paragraphs describe the distributed index mechanism of Arora is used to implement content management services, presence services notification services, message routing services and discovering query messages. The cited Paragraphs do not describe or suggest an ad hoc device executing a middleware layer to perform application and service discovery. Arora fails to disclose the claimed subject matter of feature (v)

The Examiner contends that Arora in view of Atkinson discloses the subject matter of claim 53. Applicants disagree. First, the combination of Arora and Atkinson is improper because Arora is platform based for connections while Atkinson is software based for connections. The objective of Arora is to be independent of software, as described in Paragraph 127-129 and 149. Second, neither Arora nor Atkinson disclose or suggest a middleware layer for application and service discovery. Third, neither Arora nor Atkinson form connections based on the presence of a middleware layer. Fourth, Arora and Atkinson fail to disclose each and every element of claim 53 to support a rejection under 35 U.S.C. § 103 (a), as required by MPEP 2143.03

Summarizing, the rejection of claim 53 under 35 U.S.C. § 103 (a) is without support in the cited art and does not comply with the MPEP requirements for an obviousness rejection. Withdrawal of the rejection and allowance of claim 53 are requested.

**C. Dependent Claims 2-18; 20-36; 38-44; and 46-52:**

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The subject claims are not disclosed or suggested by Arora or Arora in view of Atkinson for the same reasons indicated in connection with the consideration of claims 1, 19, 37, and 45. To expedite the prosecution of the application, Applicants withhold response to the rejection of dependent claims 2-18; 20-36; 38-44 and 46-5 until the Examiner has ruled on the patentability status of independent claims 1, 19, 37, 45 and 53.

**CONCLUSION:**

Applicants have demonstrated that the P2P network of Arora does not equate to an ad hoc network of devices including a middleware layer of software for application and service discovery, regardless of the device application program interface. Atkinson relates to changing protocol stack on the fly and does not supply the missing middleware feature in Arora. The rejection of claims 1-53 under 35 USC 102 (e) or 103(a) is not supported in the cited art. Withdrawal of the rejection, allowance of the claims and passage to issue of the application are requested.

**AUTHORIZATION**

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. 13-4500, Order No. 4208-4114US1.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit 4208-4114US1.

Respectfully submitted,  
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